Multifunctional Information Distribution System - Low Volume Terminal (MIDS-LVT)

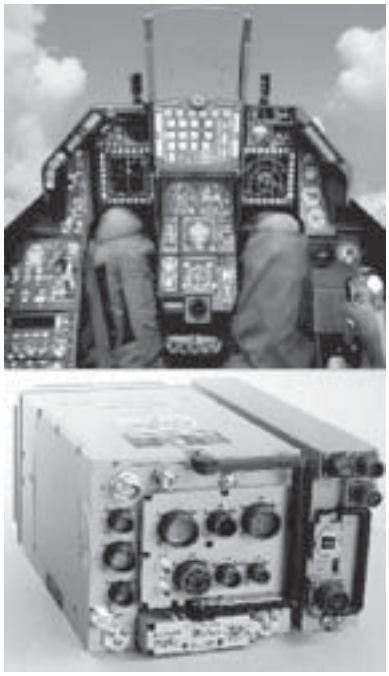
The Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT) is a communications terminal that provides Link 16 digital data link, digital voice and, for fighter aircraft, Tactical Air Navigation (TACAN) capabilities when integrated into the host platform. Link 16 is a Joint and allied digital data link that operates on an anti-jam waveform and uses standardized message sets to exchange theater tactical information such as air tracks, engagement orders, targeting information, and platform status. MIDS-LVT provides host platform interoperability with legacy Class 2 Joint Tactical Information Distribution System equipped host platforms.

There are three MIDS-LVT variants: MIDS-LVT 1 for aircraft and shipboard integration, the MIDS-LVT 2 for Army land-based host platform integration, and the MIDS-LVT 3 (also known as Fighter Data Link) for the Air Force F-15 fleet. MIDS-LVT 1 has two competing production contractors: Data Link Solutions, Inc. (DLS) and Via Sat, Inc. The Army has designated Via Sat, Inc. as the sole manufacturer of MIDS-LVT 2. The MIDS-LVT 3 program will complete deliveries in January 2004.

The MIDS-LVT 1 and MIDS-LVT 2 are planned for integration into 13 separate host platform types. The F/A-18 is the lead host platform for MIDS-LVT 1 integration and requires 53 percent of the total planned MIDS-LVT 1 acquisition of 1,880 terminals. The integration of the MIDS-LVT 1 into the F/A-18 served as the primary basis for the MIDS-LVT 1 IOT&E. The F-16 (Blocks 40 and 50) requires 35 percent of planned MIDS-LVT 1 terminals and is approximately one year behind the F/A-18 in terms of integration and test schedule.

The MIDS-LVT 1 replaces the analog AN/ARN-118 TACAN to provide a digital TACAN function for the F/A-18 and F-16 fighter aircraft. This installation is reversible in the F/A-18 allowing reinstallation of the AN/ARN-118 TACAN should the need arise. The installation of MIDS in the F-16 is permanent. The TACAN function provides air-to-ground and air-to-air modes of navigation information.

The Patriot Information Coordination Central (ICC) is the lead host platform for integration of the MIDS-LVT 2; however, the Patriot Battery Command Post (BCP) will require the majority of MIDS-LVT 2 terminals. Since Link 16 integration into the BCP is phased, the integration of MIDS-LVT 2 into the Patriot ICC and BCP Phase 1 (Link 16 not integrated into host sensors and Link 16 receive only) served as the basis for the MIDS-LVT 2 IOT&E.



The Multifunctional Information Distribution System-Low Volume Terminal provides a digital data link, digital voice - and for fighter aircraft - Tactical Air Navigation capabilities.

TEST & EVALUATION ACTIVITIES

DOT&E monitored developmental test activities and prepared pre-test predictions for the F/A-18 MIDS-LVT integration operational evaluation (OPEVAL).

DOT&E conducted an independent analysis and evaluation of the results of the Army-conducted MIDS-LVT 2 IOT&E.

The Operational Test and Evaluation Force (OPTEVFOR) conducted the first portion of the F/A-18 MIDS-LVT 1 integration OPEVAL (IOT&E) from October 2002 to March 2003. Data from over 3,900 MIDS-LVT 1 flight hours were used to complete the evaluation.

OPTEVFOR conducted the final portion (Verification of Correction of Deficiencies) of the F/A-18 MIDS-LVT 1 integration OPEVAL from July 21 to August 15, 2003.

DOT&E completed a MIDS-LVT beyond low-rate initial production report to Congress during September 2003.

TEST & EVALUATION ASSESSMENT
DOT&E concluded that F/A-18 MIDS-LVT testing was adequate to evaluate operational effectiveness and operational suitability.

DOT&E, OPTEVFOR, and the Navy's operational test squadron, Air Test and Evaluation Squadron Nine (VX-9) agree that the F/A-18 MIDS-LVT 1 integration was operationally effective but not operationally suitable.

- Principally, the air-to-ground TACAN function performance was not stable and was unacceptable for aircraft carrier approach operations. TACAN deficiencies included frequent loss of magnetic bearing and range information while in marshal and approach patterns for those TACAN stations operating in a set of notched radio frequencies, and overall reliability regarding the availability of TACAN air-to-air and air-to-ground functions.
- Built-in test (BIT) exhibited excessive false alarms, and the intermediate maintenance capability was not ready for evaluation.
- Integration testing indicated longer than required time to initialize the MIDS-LVT terminal and enter the Link 16 network while preparing the aircraft for flight.
- The F/A-18 MIDS-LVT integration does not include reliable transmission and receipt of emergency messages such as "Bailout" or "Aircraft Down."
- The F/A-18 and F-15E cannot exchange precision ground target coordinates on Link 16.

DOT&E continues to monitor F-16 MIDS-LVT 1 integration and emerging results indicate integration issues with the MIDS-LVT 1 TACAN function, terminal initialization and initial network entry, BIT false alarms, and human factors.

The Army IOT&E and preceding developmental tests indicated MIDS-LVT 2 and Patriot ICC host platform integration issues leading to loss of Link 16 data exchange.

- The testing also indicated that the MIDS-LVT 2 did not meet reliability requirements. A follow-on laboratory test conducted by the Army Test and Evaluation Command indicated that terminal modifications resulted in meeting the laboratory reliability requirement of 1,000 hours mean time between failures.
- The Army Research Laboratory conducted a very comprehensive information assurance (IA) vulnerability analysis of the MIDS-LVT 2 terminal and the data indicated some potential vulnerability with moderate to low risk of occurrence.

DOT&E makes the following conclusions with respect to MIDS systems:

- A Follow-on test and evaluation is needed to verify that the Navy has corrected the 22 major – and numerous minor – deficiencies identified in the IOT&E test reports for the F/A-18 MIDS integration.
- The F-16 MIDS-LVT 1 integration should not proceed to IOT&E until the TACAN and other emerging integration issues have been addressed.
- The Army should employ the Patriot ICC MIDS-LVT 2 in a dense Link 16 environment or large Force exercise to determine if the data exchange halts have been resolved during periods of high data throughput.
- The MIDS-LVT Program Manager should coordinate for an in-depth IA vulnerability assessment for the MIDS-LVT 1; establish a program to mitigate the vulnerabilities; and conduct a follow-on and periodic testing of MIDS-LVT 1 and MIDS-LVT 2 IA vulnerability.